

# Nearshore Fisheries

## INTRODUCTION

For the purposes of this report, 'nearshore fishery resources' are those coastal and estuarine species found in the 0-3 nmi zone of coastal state waters, and for which NOAA Fisheries has no direct management role.

Nearshore resources vary widely in species diversity and abundance. Many are highly-prized gamefish. Others are small fishes used for bait, food, and industrial products. The invertebrate species of greatest interest include crabs, shrimps, abalones, clams, scallops, and oysters. Recent average yields from coastal state waters were at least 284,035 t (Table 21-1). This amount excludes landings of large-scale nearshore fisheries like anchovy, sardine, herring and the invertebrate resources described in earlier chapters.

Because the composition of the nearshore fauna is very diverse and management authority is shared among the many coastal states and other local bodies, OLO '95 does not attempt a detailed treatment of their status. However, this chapter presents information on the more significant species of national interest. For more comprehensive assessments of individual species, readers should refer to reports published by their state fish and game agencies.

## SPECIES AND STATUS

### Northeast Region

The 1992-94 RAY for the Northeast nearshore species was at least 75,200 t (Tables 21-1 and 21-2). This estimate is conservative because it only reflects commercial landings for most of the species owing to the lack of recreational harvest estimates for many, especially the invertebrates. The 1994 dockside revenue from the commercial landings was an estimated \$175 million. Nearshore recreational value,

though not available, is considered to be substantial.

Landings of blue crab are the most important of the nearshore species for the Northeast region (Table 21-2). Commercial landings in 1993 were 58,800 t, with an ex-vessel value of over \$70 million. Abundance in Chesapeake Bay, the region's main producer, has declined due to heavy fishing and possibly predation on small crabs by striped bass and weakfish, both of which have increased in abundance. Blue crab commercial landings in 1993 were 58,800 t, with an ex-vessel value of over \$70 million. In contrast to the Chesapeake, blue crabs have been unusually abundant in Delaware and Raritan Bays, where landings have increased.

Sea urchins, with the second highest landings of the Northeast nearshore species (RAY of 15,400 t), have been subjected to ever-increasing fishing pressure since a major fishery began in Maine waters in 1987 to supply a roe market in Japan. Landings increased from about 700 t in 1987 to 19,200 t in 1993. Abundance appears to have remained fairly level, although some local areas have now been fished out because of heavy harvesting conducted largely by divers resulting in a diversion of effort to other areas.

Oysters, one of the most valuable nearshore species (commercial landings valued at \$37 million in 1993), have increased in abundance in Delaware and Chesapeake Bays, the two main areas of production. Production and landings in those areas had previously been severely depressed because of a high incidence of MSX and "dermo," two diseases which caused heavy mortality among oysters and caused a long-term decline in landings (Fig. 21-1). Below-normal salinity in the Bays and an unusually cold winter of 1993-94, which suppressed MSX and the incidence of "dermo," respectively, were associated with the recent increase in production. With Long Island Sound continuing to be the region's main producer of oysters, landings will likely increase over the next several years.

Landings and abundance of hard clams have remained level in the major producing

Table 21-1. U.S. Nearshore Resources	
<i>Recent Average Yield in metric tons</i>	
Region	Recent Average Yield (RAY)
Northeast	75,230
Southeast	90,830
Alaska	3,210
Pacific Coast	113,245
Western Pacific	1,520
Total	284,035

areas (Long Island Sound, Great South Bay, and Raritan Bay), but have declined in Narragansett and Barnegat Bays. Current levels of landings are about half of that in the early-1950s (Fig. 21-2). Ex-vessel value of landings has remained around \$40 million in recent years. There has been substantial production in recent years from private hatcheries, about 20 of which exist from Massachusetts south.

Softshell clam landings have declined since the late-1960s (Fig. 21-2) and abundance has recently declined further in Maine and Maryland, the centers of main production. Reproduction of young clams has failed in northeastern Maine in recent years due to unexplained causes, while very high clam mortality occurred in Maryland in the early-1990s due to unusually hot summers. Abundance of juvenile clams has again increased in Maryland, and abundance of adult clams is fairly abundant in Massachusetts, Rhode Island, New Jersey, and eastern Long Island. Current landings are around 2,000 t and valued at nearly \$20 million.

Abundance of blue mussels in nearshore areas of Maine and Massachusetts, which produce nearly all the landings for the region, has remained fairly stable in recent years. During the 1980s and early-1990s, landings increased markedly (Fig. 21-2). The principal source of landings during that period was a large bed east of Nantucket Island, which was harvested with dredges, until it was destroyed by a December 1992 storm. This loss has resulted in a drop in landings and a 50% increase in prices.

Bay scallop abundance in eastern Long Island and Rhode Island decreased sharply in the 1980s due to a dense algal bloom or "brown tide." Abundance subsequently increased in the 1990s in that area; abundance in Massachusetts has remained stable.

Conchs or whelks are harvested from Massachusetts through New York with pots and in Virginia with dredges. Landings have remained fairly stable, although the average size of the conchs has diminished in response to increasing harvesting. Periwinkles, harvested only in Maine, have declined slightly in abundance, with many easily accessible inshore areas depleted forcing fishermen to direct their efforts on ledges and islands further offshore.

Landings of Jonah and rock crabs have remained fairly stable, with abundance unknown but thought to be fairly high. Abundance of horseshoe crabs has declined in Delaware Bay,

the site of greatest concentration and an intense fishery. They are either collected off beaches or taken by dredges.

Sea worms, dug principally in Maine, have declined both in abundance and in average size because of heavy harvesting. These worms are highly sought as bait by marine recreational fishermen from Massachusetts to South Carolina. Fishermen in Maine,

who have traditionally been paid by weight landed, are currently demanding higher prices because of lower worm supplies.

A new fishery on sea cucumbers has begun in Maine to supply Asian markets. Abundance is presently high as fishing is being conducted on virgin stocks.

Of the finfish included in this group, only tautog has been assessed. Recreational fishing accounts for about 85% of the total landings, which have declined in recent years. Abundance

**Table 21-2.** Northeast Nearshore Resources

<i>Productivity in metric tons and status of fisheries resources</i>			
Species / Group	Recent Average Yield (RAY)	Fishery Utilization Level	Stock Level Relative to LTPY
Blue crab	39,000	Full	Near
Sea urchins	15,400	Unknown	Unknown
Atlantic hard shell clam	4,000	Over	Below
Blue mussel	3,200	Unknown	Near
Tautog	2,800	Over	Below
Oysters	2,600	Over	Below
Softshell crab	1,900	Full	Below
Jonah crab	1,100	Unknown	Unknown
Rock crab	800	Unknown	Unknown
White perch	800	Unknown	Unknown
Conchs	700	Unknown	Unknown
Horseshoe crab	650	Unknown	Unknown
Sea cucumbers	600	Unknown	Unknown
Other shads and herring	550	Over	Below
American eel	400	Unknown	Unknown
Sea worms	400	Unknown	Unknown
Bay scallop	130	Over	Below
Periwinkles	100	Unknown	Unknown
Total	75,230		

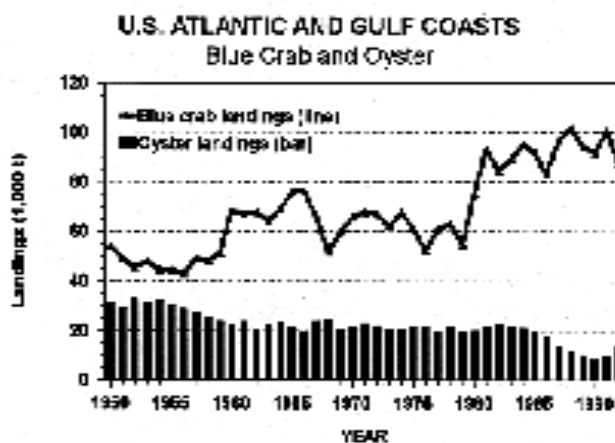


Fig. 21-1. Commercial landings of blue crab and oysters from the U.S. Atlantic and Gulf coasts.

has also declined to record low levels in the past several years.

Southeast Region

Relatively few fisheries from the southeast are highlighted in this unit, as many of the truly nearshore fisheries of the region have been

Bluefish landings have averaged 2,140 t; more than two-thirds are commercial and one-third recreational. Spanish sardine, herrings, and butterfish RAYs total about 6,700 t in the southeast. Virtually all of this catch comes from commercial landings. Breakouts by individual species are not possible due to confidentiality—several species are landed by only 1 or 2 firms. There are numerous baitfish fisheries in the region that are not generally or unevenly covered by the commercial statistics sampling program. Also, some nearshore species taken as bycatch in the shrimp fisheries are not accounted for in the sample collections. This discarded catch may be considerable.

Pacific Coast

California contributes the most commercial landings of nearshore species for the entire Pacific coast at more than 61,000 t (Table 21-4). This was followed by Washington (31,000 t) and Oregon (20,000 t). The total value of the fisheries, much of which is recreational, cannot be easily estimated but is thought to be sizable. Although not a direct measure of economic value, an estimated 2 million anglers, in California alone, spent \$600 million each year on approximately 7 million fishing trips to catch nearly 30 million saltwater fish—most in nearshore waters. In addition to the many commercial nearshore species, anglers also land species that have been reserved exclusively for sport—such as striped bass, sturgeon, kelp bass and California corbina.

Shrimp resources—Shrimps support nearshore commercial fisheries throughout the Pacific region. They also provide for recreational fishing, especially near urban centers like in Puget Sound, Washington. The most common species harvested are pink, Pacific ocean, spot, side-stripe, and bay shrimps. In recent years, landings appear to be on a slight increase from a cyclic low (Fig. 21-3). Ridgeback, pink, and spot prawns are taken in California.

Crab resources—Dungeness crab is the most abundant crab harvested along the Pacific coast. Commercial fisheries operate along all the west coast states, with Oregon and northern California providing the bulk of the landings. Some recreation crabbing also occurs and is an important recreational and subsistence fishery to many ethnic groups. Like other crustacean resources, the abundance of Dungeness crab is highly variable. In recent years, abundance

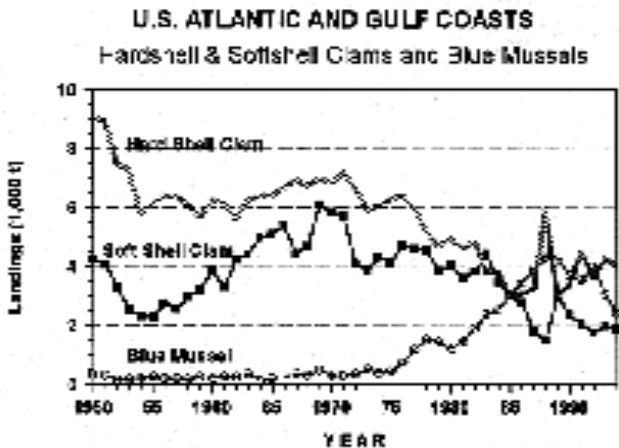


Fig. 21-2. Commercial landings of hard and softshell clams and blue mussels from the U.S. Atlantic and Gulf coasts.

covered under Units 7, 9, 10, and 11. In the southeast as in the northeast, RAYs reported are underestimated, because they can generally be based only on commercial landings. Recreational landings, which may be considerable, are generally unavailable for the invertebrates that dominate the Southeast nearshore fisheries. Bycatch mortality is not estimated, or incompletely estimated, for many species.

Blue crabs dominate the nearshore catch by weight. Recent landings have fluctuated around 60,000 t (Fig. 21-1, Table 21-3). Oyster harvest

have trended downward over the last decade, with recent yields about 7,900 t. Calico scallop has been important in the landings in the past (20,000 t in 1984), but recent landings have averaged 830 t.

Mullet landings in the region have been stable at about 15,000 t. Commercial landings outweigh the recreational catch by about 14:1.

Table 21-3. Southeast Nearshore Resources			
Productivity in metric tons and status of fisheries resources			
Species / Group	Recent Average Yield (RAY)	Fishery Utilization Level	Stock Level Relative to LTPY
Blue crab	58,500	Full	Near
Mullet	14,730	Unknown	Unknown
Oysters	7,920	Over	Below
Bluefish	2,140	Unknown	Unknown
Calico scallop	830	Unknown	Below
Spanish sardine, herrings & butterfish	6,710	Unknown	Unknown
Total	90,830		

seems to be on the increase from a low cycle. The productivity and status of the other crab resources, which tend to be localized, are largely unknown.

**Abalone**—Abalones are found mostly in California where utilization of the resource actually predates modern history. The meat is very valuable; a 14-ounce canned abalone may retail for \$50.00 in Seattle's Chinatown. Five species are harvested; the more common include the red, green, and black abalones. The red abalone dominates the commercial catch. Harvesting is accomplished by "hooka" gear, where compressed air from the surface is supplied to the divers. Where allowed by law, recreational abalone-pickers use SCUBA gear, otherwise sport fishing is restricted to free diving and shore picking. In California, the use of SCUBA is illegal north of Yankee Point in Monterey Bay. At the present time, most of the species of abalones in central and southern California are overutilized. This is due to commercial harvesting efficiency, increased market demand, popularity of the sport fishery, habitat degradation, increasing predation by sea otters, and disease. At least part of the decline in landings may be attributed to the California statewide closure on sport and commercial take of black abalone, which was imposed in July 1993 to allow recovery for survivors of a disease known as withering syndrome, which continues to decimate black abalone populations. Despite increasing management, abalone stocks remain vulnerable to continued depletion. The history of catches shows a continually declining trend (Fig. 21-4).

**Clams**—Clam digging is a popular recreation for many families throughout the Pacific coast, and most are harvested this way. Many species are harvested: razor clam, littleneck clams, pismo clam, gaper clam, Washington clam, butter clam, geoduck clam, and others. The clam fisheries are regulated by open-and-closed seasons and by bag limits. The status of the stocks can be inferred from catch performance and would be expected to be known for localized areas only. Since the number of beaches and, thus, stocks are too numerous, it would be difficult to generalize on the status of the stocks. Thus status of the stocks and degree of utilization are largely unknown.

The Pacific geoduck is the largest burrowing bivalve on the Pacific coast. Individuals can live for more than 100 years and reach 9 kg. They are harvested both commercially and

recreationally with the majority of the harvest coming from Puget Sound and British Columbia. Commercial harvest is by divers using high pressure jets to excavate the clams. In Puget Sound, the population between 10 and 30 m depth is estimated at 127,000 t, and the average annual commercial harvest is 1,300 t.

**Squid**—One species, the market squid, is harvested throughout the region, with California providing most of the catches. It is harvested for bait as well as for food. In southern California, squid is popular in local ethnic food markets and the restaurant trade. Squid jigging is also a popular winter activity in the Pacific Northwest. In this sport, anglers of all ages crowd under pier lights and jig for squid in the middle of cold winter nights.

Large-scale fluctuations are characteristic of the squid stock, due mainly, to its short life span and wide variations in ocean environment. This short life history, however, makes it possible for squid to recover after disasters as soon as ocean environment turns good again. Little is known about the biomass, structure, and status of the stock.

**Sea Urchins**—Commercial utilization of sea urchins in the United States is relatively recent in history; started essentially in the early-1970s for the roe or "uni" of red urchins, which is exported for the Japanese "sushi" market. In addition to red urchins, several other species are found in U.S. waters, but most are of little commercial importance due to the

**Table 21-4.****Pacific Coast Nearshore Resources**

<i>Productivity in metric tons and status of fisheries resources</i>			
Area / Species	Recent Average Yield (RAY)	Fishery Utilization Level	Stock Level Relative to LTPY
<b>California</b>			
California market squid	34,100	Unknown	Unknown
Sea urchins	12,500	Full	Near
Shrimps & prawns	6,000	Full	Near
Dungeness crab	4,800	Full	Near
Other crabs	620	Full	Unknown
Pacific bonito	650	Unknown	Unknown
Smelts & silversides	590	Full	Unknown
Elasmobranchs	420	Under	Near
California halibut	300	Under	Near
Sea cucumbers	270	Unknown	Unknown
Spiny lobster	240	Full	Unknown
Abalones	190	Over	Below
Croakers	170	Unknown	Unknown
Pacific barracuda	70	Unknown	Unknown
Bivalves	20	Unknown	Unknown
Other fish & invertebrates	500	Unknown	Unknown
California Total	61,440		
<b>Oregon</b>			
Shrimps	13,910	Full	Near
Dungeness crab	5,000	Full	Near
Sea urchins	1,040	Unknown	Unknown
Clams	60	Unknown	Unknown
Squids	60	Unknown	Unknown
Elasmobranchs	60	Under	Unknown
Sturgeon	110	Full	Near
Pacific herring	90	Full	Near
Smelts	5	Unknown	Unknown
Oregon Total	20,335		
<b>Washington</b>			
Shrimps	5,520	Full	Near
Dungeness crab	5,070	Full	Near
Geoduck clam	1,300	Unknown	Unknown
Other clams	8,680	Unknown	Unknown
Oysters	3,320	Unknown	Unknown
Scallops	40	Unknown	Unknown
Sea urchins	2,200	Unknown	Unknown
Elasmobranchs	1,550	Under	Unknown
Pacific herring	3,000	Full	Near
Smelts	30	Unknown	Unknown
Octopus	30	Unknown	Unknown
Washington Total	31,470		
Pacific Coast Total	113,245		

<sup>1</sup> 1992-94 average calculated from California Department of Fish and Game commercial catch statistical reports. This period encompasses the 1992-93 El Niño conditions off California.

<sup>2</sup> For example, species such as mako sharks are under to fully utilized; thresher and leopard sharks are fully utilized; and spiny dogfish is underutilized.

<sup>3</sup> Considered underutilized since the gillnet fishery directed for this species ended January 1994 south of Pt. Arguello, where 86% of the gillnet catch had been taken.



small size of their roe. Though limited fisheries for red urchins take place off Washington and Oregon, a major fishery occurs in California. The commercial fishery for red sea urchins began in southern California in 1971 as part of a NOAA Fisheries program to develop fisheries for underutilized species. In the late-1970s and 1980s the fishery expanded to northern California, and in 1990, the value of the catch (20,534 t) amounted to \$24.7 million, making it the most valuable fishery in the state. Commercial divers dive for the species using “hooka” gear mainly within the 7-20 m depth range. The species is landed alive. The resource has been generally underutilized throughout the Pacific coast, except for selected commercial fishing areas. In southern California, the sea urchin resource remains productive, suggesting that the status of the stock there is still good. In other areas, however, like northern California and Baja California, the fisheries have been characterized by rapid growth and decline. These experiences suggest that local stocks can be rapidly overharvested.

California; the species harvested in California are the giant red sea cucumber and the warty sea cucumber. Little is known about the abundance and status of the stocks. Sea cucumbers have a relatively short life span, a low maximum weight, a low age of first maturity, a high natural mortality and have highly fluctuating recruitment patterns. At the present low level of harvest, the resource appears not to be threatened at this time.

Elasmobranchs—Sharks, skates, and rays are taken commercially and recreationally and as bycatch in both segments of these fisheries. In certain areas they are taken as bycatch in commercial groundfish fisheries and swordfish fisheries. A growing number of incidental catches are landed for human consumption, but many are discarded at sea. Some are harvested for their fins to supply the Asian “shark’s fin soup” market. Most of the elasmobranch species of higher recreational and commercial value are found in the warmer waters of southern California. Species taken include Pacific angel shark, leopard shark, thresher sharks, shortfin mako, blue shark, and cow sharks. Skates and rays are also harvested, often for their wings to supply the imitation “scallop meat” market.

Over the past two decades a tremendous amount of fishing pressure has focused on elasmobranchs. Just 15 years ago, the group was considered underutilized off California, but now, increased utilization for commerce and sport may have impacted the resources in localized areas. On the other hand, the total elasmobranch resource is thought to be underutilized throughout most of the Pacific coast states.

Although the life history characteristics of some of the elasmobranch species are fairly well known, their abundance and status are largely unknown. Some species have wide geographical ranges that make stocks assessments difficult. Elasmobranchs generally have low reproductive potentials and slow growth rates, which make them vulnerable to rapid local depletion.

Smelts—Smelt resources in the region belong to two different families, Osmeridae (the true smelt) and Atherinidae (the silversides). There are a number of species of the two families. The resources provide for seasonal commercial and recreational fisheries for Washington, Oregon, and California. The resources are known for their migratory runs to coastal areas and rivers to spawn. They come en masse which makes them attractive targets for recreational and commercial fisheries. Some

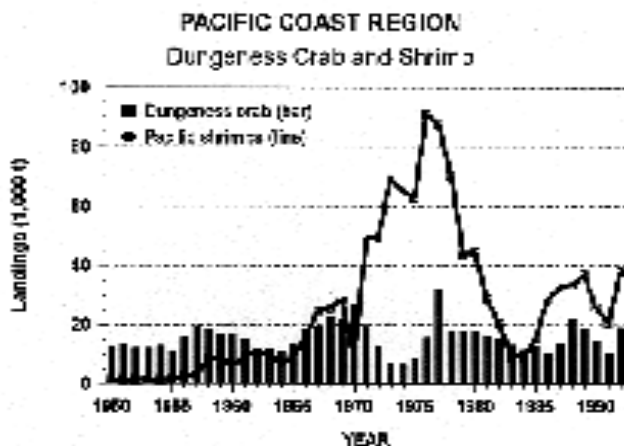


Fig. 21-3. Commercial landings of dungeness crab and Pacific shrimp off Washington-Oregon-California region.

Sea cucumbers—Like sea urchins, sea cucumber emerged relatively recently as a commercial species in the late-1970s. The slimy, warty creature is harvested by trawl and by hand and processed into a dried product, primarily sold to the Asian market where it is a delicacy. In 1994, 89% of the California sea cucumber catch was landed by trawlers. There are a variety of species that are found from Washington to

smelt fishing is almost a ritual. Night smelt, for example, with its nocturnal habits are harvested during a brief spawning period by A-frame dip nets in the surf zone. Most are caught in the Eureka, California, area. The grunion (a species in the “smelt group”) fishery is quite unique since fishers may use only their hands to grab the fish during their spawning runs on southern California beaches.

Despite their economic and social importance to humans and to ecologically related species as an important forage-base species, the abundance and status of many smelt stocks are still poorly known. Much is known of the species’ biology and location and timing of the runs, but more is yet to be learned about the causes of population fluctuations and long-term trends.

### Western Pacific Oceanic Region

Fisheries in the nearshore waters of the tropical and subtropical islands of Hawaii and the U.S.-associated Pacific islands are highly diverse though lower in aggregate volume than commercial or recreational fisheries of the United States mainland. Commercial landings are reported to be 1,500 t (Table 21-5). Many fisheries are unique to certain localities such as that for the palolo worm in American Samoa, seasonal fisheries for rabbitfish in Guam, and limpet (opihi) fisheries in Hawaii. Other fisheries are common to all islands, such as the fisheries for bigeye scad, called akule in Hawaii, atule in American Samoa, and atulai in Guam and the Northern Mariana Islands.

The more highly populated main Hawaiian Islands receive the heaviest inshore fishing pressure, with lighter pressure in the less densely populated islands elsewhere to the mostly uninhabited islands of the Northwestern Hawaiian Islands and the northern islands of the Commonwealth of the Northern Mariana Islands. In the main Hawaiian Islands, between 1980 and 1990 an average of 1,179 t of fishes and invertebrates were reported taken annually within 100 fathoms by commercial fishermen. According to the Hawaii Division of Aquatic Resources, the two pelagic carangids, akule and opelu, support the largest inshore fisheries in the State. During the 1980-90 period annual commercial landings for these two species within three miles of shore averaged 184 and 113 t for akule and opelu, respectively. Other important commercial fisheries include those for

surgeonfishes, squirrelfishes, parrotfishes, goatfishes, snappers; octopus, and various jacks or trevallies. There are significant recreational fisheries, but participation, landings, expenditures and economic values are not well documented. The recreational and subsistence component of Hawaii’s marine fisheries was last assessed in 1986, when it was estimated that 200,000 trips were taken by 6,700 vessels involved in non-market fishing (which includes recreational, subsistence, and sub-market sales). Estimated landings by these “recreational” fishermen was 9,525 t (21 million pounds), of which 4,536 t (10 million lbs) were sold (\$22 million). Total direct expenditures by these fisheries was \$24 million, and the non-market value of the fishing experience was valued at \$239 million.

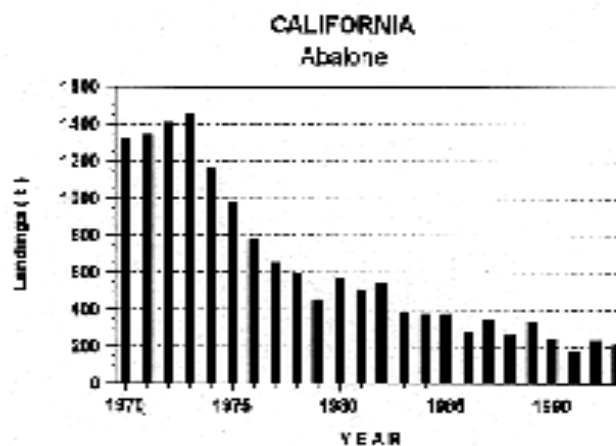


Fig. 21-4. California commercial landings of abalone.

The islands of American Samoa are partially surrounded by a narrow fringing coral reef which is inhabited by a diverse array of fishes and invertebrates. These are harvested by local residents on an almost daily basis. Total inshore subsistence catch was estimated in 1991 to be 207 t worth \$798,000. The catch is dominated in some years by the coastal migrant atule, but other more resident species such as other jacks, surgeonfish, mullet, octopus, groupers, and snappers are most consistently taken. Samoans also fish on the predicted nights of emergence of the palolo worm, which is considered a delicacy (actually its reproductive segments or epitokes). For Samoan inshore

fisheries, downward trends in catch and catch per unit of effort have been observed in recent years, especially when the catches of the highly variable atule have been removed from the analysis.

Table 21-5. Western Pacific Nearshore Resources			
<i>Productivity in metric tons and status of fisheries resources</i>			
Area / Species	Recent Average Yield (RAY)	Fishery Utilization Level	Stock Level Relative to LTPY
<b>Western Pacific Region</b>			
Akule <sup>1</sup>	180	Full	Unknown
Opelu <sup>1</sup>	110	Full	Unknown
Other inshore fisheries <sup>1</sup>	880	Full	Unknown
Inshore reef fishes <sup>2</sup>	140	Full	Unknown
Inshore reef fishes <sup>3</sup>	210	Full	Unknown
<b>Total</b>	<b>1,520</b>		
<sup>1</sup> Main Hawaiian Islands (1980-90 average)			
<sup>2</sup> Guam (1991)			
<sup>3</sup> American Samoa (1991)			

Guam is the southernmost and largest island in the Mariana Island Archipelago, and like American Samoa, the principal inshore fisheries are based on a wide assortment of coral reef fishes. Fishes taken are jacks and scads (especially atulai, the bigeye scad), surgeonfishes, squirrelfishes, fusilier, rudderfish (guili), snappers, mullet (aguas), goatfishes (Ti'ao), and rabbitfishes (mañahak).

Invertebrate species include various marine crabs (including land crabs), spiny and slipper lobsters, sea urchins, octopus, squid, cuttlefish, tridacnid clams, topshell, chitons, conchs, strombids, and nerites. Guam inshore reefs appear to be fully exploited and have shown signs of overfishing. In 1991, the catch of nearshore reef fisheries was estimated at 140 t.

### Alaska Region

Aside from salmon, crabs, shrimps, herring, and groundfish that support major fisheries both nearshore and at sea, nearshore resources have also provided subsistence and recreational fishing opportunities for Alaskans. Subsistence and recreational fishing are important activities and rights for Alaskans. The amount of nearshore resources harvested by the subsistence and recreational fisheries, however, has been difficult to compile. Excluding the recreational and subsistence catches of salmon and Pacific halibut, RAY is expected to be at least 3,000 t for the nearshore resource complex (Table 21-6). The component of the nearshore resources that have important commercial fisheries is the invertebrates. In declining order of mean percentage of landings since 1969, these include Dungeness crab, scallops, clams, sea cucumbers, sea urchins, abalone, octopus, squid and oysters.

Dungeness crabs are harvested nearshore by small boat commercial fleets and recre-

ational fisheries primarily in the Southeast Alaska, Yakutat and Kodiak areas. About 30% of the U.S. production of Dungeness crabs traditionally comes from Alaska. Almost all Dungeness crabs (97%) are consumed domestically. The value and demand for the crab are normally high. Abundance of Dungeness crab resources are normally cyclic. In recent years, abundance off Alaska has been at the low end of a production cycle. Recent average yield has been about 2,000 t worth about \$4.3 million.

The primary species of scallop harvested in Alaska is the weathervane scallop. The fishery was pioneered in 1967 and peaked in 1969 when 840 t of shucked scallop meat was landed. The principal harvest areas are Kodiak and Yakutat in the Gulf of Alaska, with Dutch Harbor (Bering Sea) as a new fishing ground. Harvesting is conducted by the same dredging gear and technique used in the New England scallop fisheries. While the status of the stocks are not well known, they are not believed to be large and are vulnerable to overfishing. Judging from recent landings which have been down, the status of the stocks may also be down. The fishery is regulated by the State of Alaska that limits the numbers of vessels and catch quota.

Sea cucumbers and urchins are recently developed fisheries. The first commercial landing of sea urchins was made in 1980 and that for sea cucumbers in 1983. Landings of urchins peaked at 212 t in 1992 and sea cucumber catch peaked at 100 t in 1990. They are harvested by divers and exported to Asian markets. Sea urchins are harvested and shipped live to Japan for their fresh roe. While the status of the stocks are largely unknown, their harvests are managed conservatively according to recent historical performances of the fisheries. The ADF&G surveys the resource periodically at selected sites to monitor major changes in relative abundance of the stocks.

The principal species of abalone harvested in Alaska is pinto abalone, taken almost exclusively from Southeast Alaska. Alaskan natives have a long history of harvesting abalone for food, trade, and shell ornaments. The commercial fishery, involving hand-picking by divers, is relatively young. Commercial catch peaked at 82 t in 1977 and RAY is only 23 t. Abalones are gourmet food and are normally exported to Japan. The status of the stocks is unknown and the fishery is regulated by ADF&G through monitoring of recent catch trends.

## ISSUES

### Habitat Concerns

Pollution, habitat degradation, disease, salinity and waterflow changes, and other environmental problems pose a continuous threat and concern for nearshore resources. The invertebrate species in particular and the fisheries on them are continually threatened by these problems which can contaminate the animals and prevent their sale for human consumption, or damage or destroy their habitat and the ability of the species to reproduce, grow, or survive. Excessive nutrient loads may increase toxic plankton blooms that cause “red tides” or “brown tides” and paralytic shellfish poisoning. The diseases MSX and “dermo” have destroyed millions of bushels of oysters in the Delaware and Chesapeake Bays since the late-1950s and have recently spread to coastal North Carolina where similar losses are occurring.

Salinity changes resulting from variable weather patterns can easily affect the survival of oysters both positively and negatively. Extreme low salinities in the upper portions of estuaries can kill oysters, while low salinities in the lower portions of estuaries can suppress the disease MSX and allow more oysters to survive.

Meso- to large scale climatic changes such as prolonged warmwater, nutrient-poor conditions stemming from tropical El Niños can depress resource production and confound recovery of some stocks while possibly aiding the recovery of others (e.g., Pacific sardine).

### Management Concerns

Interspecific predation can affect the abundance of valuable species. For example, killifish, which are harvested for bait, prey on young softshell clams; scup, a target of both commercial and recreational fishermen, eat young bay scallops; blue crabs consume juvenile hard clams and oysters; ducks eat young softshell clams and mussels; striped bass and weakfish, highly sought by recreational fishermen, prey on small blue crabs; and horseshoe crabs, used as bait by conch/whelk fishermen and for medicinal/medical research purposes, consume young clams.

Harvesting practices for certain species can adversely affect the abundance of other important species. For example, people digging sea worms in Maine simultaneously kill many immature softshell clams, while fishermen dredging for blue mussels in sea worm habitat (mud flats) also destroy worms.

Most states have long-standing regulations governing the harvest of invertebrates. These regulations may restrict harvesting by means of seasonal and areal closures, minimum sizes, catch quotas, daily limits by individuals or boats, or by the numbers of licenses issued. □

**Table 21-6.**

### Alaska Nearshore Resources

*Productivity in metric tons and status of fisheries resources*

Species / Group	Recent Average Yield (RAY)	Fishery Utilization Level	Stock Level Relative to LTPY
Dungeness crab	2,000	Full	Below
Scallops	570	Full	Unknown
Geoduck clam	70	Unknown	Unknown
Other clams	200	Unknown	Unknown
Sea urchins	100	Unknown	Unknown
Sea cucumbers	60	Unknown	Unknown
Abalone	20	Unknown	Unknown
Inshore fish	50	Under	Below
Other species	100	Unknown	Unknown
<b>Total</b>	<b>3,170</b>		